IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Joan Vermeersch et al.
Filed: February 5, 2002

Art Unit: 2854

Appl. No. 10/068,017

ON-PRESS EXPOSURE AND ON-PRESS PROCESSING OF A LITHOGRAPHIC MATERIAL.

DECLARATION UNDER 37 CFR § 1.132 FROM JOAN VERMEERSCH.

Joan Vermeersch declares as follows:

1. That he is a joint inventor of the subject matter of the United States Patent Application No. 10/068,017 and is intimately familiar with the contents of the present application and its prosecution before the United States Patent Office.

2. That he has successfully studied at the University of Gent, Belgium where he became Doctor in Science. He has been working in the field of Lithographic Printing at Agfa for fifteen years where he obtained excellent technical expertise in the field of lithographic printing. Dr. Joan Vermeersch has been designated as an inventor of not less than 150 US patents and patent applications, all directed to the field of lithographic printing.

3. That he has studied the contents of the art cited in the present application.

4. That the term "ink" as used in Vermeersch et al. EP 770,494 or US 5,786,128, refers to what is known by the skilled person as conventional lithographic ink used in conventional lithographic printing. As lithography is based on the immiscibility of water and ink, more precisely on the immiscibility of aqueous dampening liquid and oily ink, it is a fundamental requirement that litho ink is oil-based so that it separates from water. During lithographic printing, both the aqueous dampening liquid and the oily ink are supplied to the plate. On the plate, the water separates from the ink, adheres to the hydrophilic (non-printing) areas of the plate and thereby renders these areas ink-repelling. See Exhibit A (The print and Production Manual, 8th Ed., Pira Publishing, 1998, pages 4.6-4.7). If no water would be supplied during lithographic printing, the ink would wet the whole plate and a completely black print would be obtained. Thus, the term "ink" occuring in the document '494 or '128, unmistakably refers to a greasy, water immiscible ink.

5. That in order to demonstrate that the method of lithographic printing presently claimed invention is not obvious to those of ordinary skill in the art, he has carried out Examples 1 and 2, Series 1 to 3 (Table 2). In Examples 1 and 2, an image-recording layer comprising a hydrophobic latex, a heat absorbing compound and a hydrophilic binder was applied onto a conventional grained and anodized aluminium support. The compositions of the image-recording layers are summarized in Table 1. The unexposed plate was mounted on the print cylinder of a Heidelberg GTO52 printing press, equipped with a Dahlgren integrated ink supply / dampening system. The press was started and ink (Series 1), ink/fountain (Series 2) and single-fluid ink (Series 3) were supplied to the image-recording layer. After 1, 50 and 100 revolutions, the optical density on paper was measured using a Gretag MacBeth D19C densitometer (Table 2). A perfect clean-out of the plate results in no ink uptake and produces a Dmin=0. When only ink is used as processing liquid, even after 100 revolutions, D min remains higher than 0.5. Clear prints were obtained after 100 revolutions when processed on press by using ink and fountain as well as by using single fluid ink.

Table 1: composition of the imaging layer.

Ingredients %wt	Example 1	Example 2
copolymer latex, 60 nm – 70 nm particle size 70 mol% acrylonitrile/ 30 mol% styrene	75	73
IR absorber as specified in patent Application serial no. 10/068,017	10	12
polyacrylic acid binder, Mw=500.000g/mol	15	15

Table 2: Dmin results.

Dmin			
Series*	Prints	Example 1	Example 2
1	1	0.508	0.518
	50	0.914	0.904
	100	0.502	0.898
2	1	1.082	1.075
	50	0.236	0.198
	100	0.004	0.005
3	1	1.182	1.187
	50	0.231	0.127
	100	0.002	0.001

*Series 1: ink K + E Novavit 800 Skinnex as processing liquid,a typical greasy lithographic ink available from BASF Drucksysteme GmbH
*Series 2: ink K + E Novavit 800 Skinnex and fountain (4% Combifix in isopropanol/water 10:90) as processing liquid
*Series 3: single fluid ink from Flint Ink Corporation as processing liquid

6. That the results in Table 2 make it quite clear that the material defined in the present claims cannot be processed with ink alone: even after 100 revolutions, Dmin remains larger than 0.5 (Series 1). Processing with ink and fountain on the other hand results in a complete dissolution of the coating (Series 2). The same excellent developing results are obtained by using single fluid ink as developer solution (Series 3). So it is concluded that processing with ink only is not a suitable method for processing materials as defined in the present claims. It is clear that the skilled person who follows the suggestion of Vermeersch et al. '494 to process plates comprising hydrophobic latex particles with only ink, would get black prints even after 100 revolutions. Thus, ink alone does not develop plates based on latex coalescence but the presence of an aqueous phase in the developing solution is essential (as illustrated by the Dmin results of Series 1 versus Series 2). As single fluid ink does not contain an aqueous phase but is an emulsion of an ink phase and a non-aqueous polar phase, it would be expected that the use of single fluid ink as developing solution would not work for the plates defined in the present claims. It is therefore surprising that single fluid ink is an efficient processing liquid for these plate precursors which provides plates that deliver prints without toning (ink uptake in unexposed areas).

7. (a) The expectation of success in combining the teachings of Vermeersch et al. '494 and Teng '571 to arrive at the presently claimed invention is less than reasonable in view of the differences that exist in the working mechanisms of the printing plate precursors of Vermeersch et al. '494 and of the printing plate precursors of Teng,

(b) In the plates of Vermeersch et al. '494, the imaged parts become insoluble by heat-induced coagulation. Coagulation may result from heat-induced coalescence, softening or melting of the thermoplastic polymer particles. The developer solution, i.e., ink and fountain solution, removes the non-imaged parts without solubilizing and/or damaging the imaged parts. If one were to replace this aqueous ink developer

solution (in two parts) by the single-fluid ink, the single-fluid ink should not only be capable of removing the non-image parts, but also the imaged parts should be resistant, i.e., insoluble, towards the single-fluid ink. However, starting from the teaching of Teng, there is no indication that both these requirements would be fulfilled for the plates of Vermeersch et al., at least for the following two reasons.

(c) First, Teng teaches insolubilization of the imaged parts through polymerization or cross-linking of two resins (monomers, oligomers or polymers): chemical covalent bonds are formed resulting in insolubility towards the single-fluid ink. In the plates of Vermeersch et al. '494, the exposed parts become insoluble towards ink and fountain only by heat-induced coalescence, softening or melting of the thermoplastic polymer particles, i.e., without the formation of covalent bonds. It is, in other words, not at all evident that the imaged parts of such plates which are resistant towards "conventional" ink and/or fountain solution, are also resistant to single-fluid inks which comprise a polar phase instead of an aqueous phase.

(d) Second, the ingredients, which should be removable when not exposed, used in the plates of Teng are totally different than the ingredients used in the plates based on latex coalescence of Vermeersch et al. For example, the hydrophobic polymers in the plates of Vermeersch et al. '494 are necessarily present in particle form while the hydrophobic polymers in the plates of Teng are "binders" (see column 6, lines 49-59), i.e., they form a film matrix immediately after coating (the particles of Vermeersch et al. form a matrix upon image-wise exposure). It is therefore not evident that the non-imaged parts of Vermeersch et al. are removable by using single-fluid ink instead of ink and fountain.

(e) The foregoing shows that the utilization of single-fluid ink instead of ink/fountain solution as developer should not only ensure the complete removal of the non-image parts, but should also ensure that the imaged parts remain unaffected. Both these process requirements are not derivable from Teng because there is no such indication in Teng (or expectation of success) that single-fluid ink would work for other plates than the plate of his invention. See column 9, lines 55-57: "The recently introduced single-fluid ink by Flint Ink Company, which can be used for printing wet lithographic plate without the use of fountain solution, can also be used for the on-press development and printing of the plate of this invention."(Emphasis added).

(f) The plates of Vermeersch et al. '128 based on aryldiazo sulphonate polymer do not involve heat induced coagulation of a polymer latex. The aryldiazo sulphonate polymer is present as a film-forming binder, not as a dispersed latex particle. The imaging mechanism of such a coating relies on heat- or light-induced insolubilization. The image parts become insoluble by photolysis of the water-solubilizing aryldiazo sulphonate group: i.e. the diazo bond of the aryldiazo sulphonate polymer readily decomposes with release of nitrogen, thereby splitting off the sulphonate group and rendering the polymer insoluble. So, the plates of Vermeersch '128 can also be distinguished from Teng because there is no formation of covalent bonds and as a result, it is not evident that the imaged parts of these plates which, according to Vermeersch '128, are resistant towards 'conventional' ink and/or fountain solution, would also be resistant to single fluid inks which comprise a polar phase instead of an aqueous phase.
The coating solution of the plates of Vermeersch '128 is water based; it would

therefore be obvious to the skilled person that the non-imaged parts of such plates are removable with (an aqueous) fountain solution. However, single-fluid ink does not contain water. The ingredients used by Vermeersch '128 are totally different from the ingredients used in the plates of Teng and therefore, there is no indication starting from Teng that the non-exposed ingredients of Vermeersch '128 would be removable in single fluid ink as single fluid ink comprises no aqueous phase.

In summary, the disclosure by Teng that his plates can be developed with single-fluid ink means that the non-exposed areas of his plates are removable with single fluid ink and that the exposed areas are resistant to single fluid ink. However, this cannot be regarded as a hint that also a non-exposed aryldiazosulphonate or a polymer latex is removable with single fluid ink (in view of the different chemical nature of these ingredients) and neither that exposed aryldiazosulphonate or a coalesced polymer latex is resistant towards single fluid ink (in view of the different imaging mechanisms).

8. That all statements are made herein of his own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of the Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any United States Patent issued thereon .

Joan Vermeersch

Joan Vermeersch

Date: April 19, 2004

APPENDIX

52295

EXHIBIT A

THE Print AND Production Manual

• edited by

• Michael Barnard

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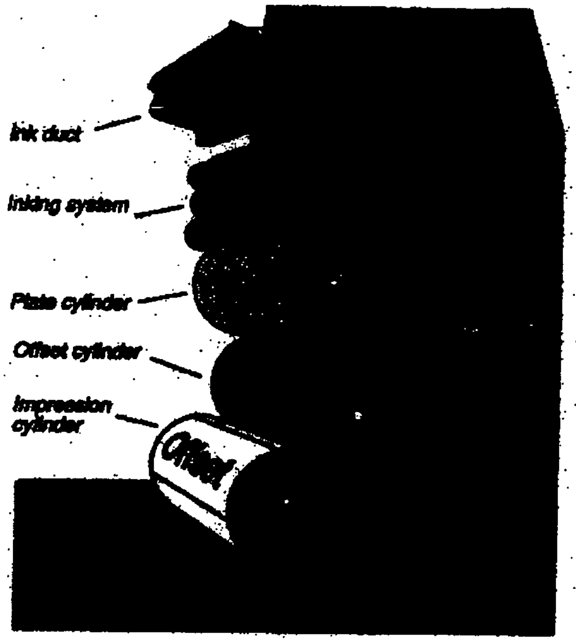


transferred to the substrate. This provides print quality and production benefits.

The dampening system

A dampening system supplies a controlled amount of water to the plate. The one shown in Illustration 4.4 is integrated with the inking. Such systems attain ink-water balance more quickly, reducing the number of waste sheets at start-up. High waste levels are regarded as a characteristic of lithography, but this is less true with modern systems. There are other forms of dampening unit, employing rotary brushes with flicker blades and some in which the dampening solution is sprayed into the system. All systems are designed to supply an adjustable, but controlled, film of water to the plate.

Fountain solution

Although the lithographic process will work with water only as the dampening medium, the process works more efficiently if chemical additions are made to the water. This normally takes the form of a liquid fountain solution concentrate. The nature of the concentrate is determined by factors such as: type of dampening system; nature of local water supply; and type of ink. Some require the use of ISO propyl alcohol.

The inking system

The viscose nature of litho ink necessitates an inking system with many linked rollers to break the ink down into the thin film that is applied to the plate. This presents a problem because the rollers retain a surplus of ink in those areas where it has not been removed by the image. It is necessary therefore to replenish the ink in zones to accommodate the different requirements of the image being printed.

On modern presses each zone is precisely adjusted by its own individual motor, allowing the adjustment to be made from a remote control desk.

There will normally be provision for ink-zone settings to be preset, recorded and stored. The data for presetting may be obtained from a plate scanner or via an interface with the digital datafile used for plate imaging. All this could be avoided if the process was able to use a simple inking system like that used in flexography. So-called 'keyless' presses have been developed, but this approach is currently only possible with the lower viscosity ink that is typically used for newspaper printing.

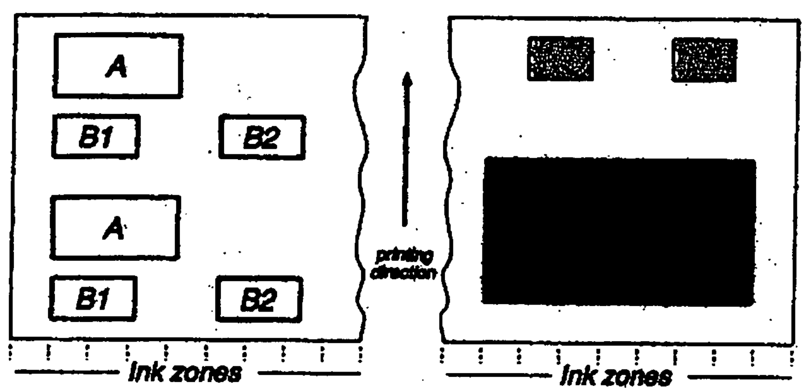
Inks and ink drying

The litho ink must be oil-based so that it separates from the water (a fundamental requirement). This requirement and the large surface area of the inking system restricts the possibilities for ink drying. The ink must remain open on the rollers and only dry on the substrate. Lithographic sheet-fed inks normally dry by a combination of penetration and oxidation which takes some hours to complete. This is unacceptable for some production, therefore IR radiation driers may be used to accelerate the process. Alternatively, presses are equipped with UV radiation drying, which provides instantaneous curing when used with special inks.

In web offset printing the paper moves so rapidly through the press the ink does not have time to dry by oxidation. If the paper is absorbent, like newsprint, the setting of ink by absorption is normally sufficient. This is

Tracking problems

All litho printing presses have inking systems that require ink to be adjusted in zones across the sheet. This means the inking levels have to be adjusted for individual images to obtain a colour match to the passed proof. Difficulties may be experienced where a heavy image coverage is in track with the light coverage of another, because the rate of replenishment required to meet the needs of one is too great for the other. This is referred to as a tracking problem. Tracking problems also arise if images, proofed to different specifications, are printed in the same track. Tracking problems of this nature should be prevented by applying tighter compliance to the standards at the proofing stage. The figures below illustrate the two basic situations in which a tracking problem may occur.



Illus. 4.5 Situations in which tracking problems can occur

In the example on the left, images marked A have been proofed to a different specification to images marked B. When inking is adjusted to optimise the quality for the B images, the A images are too light. If the inking is correct for A then the Bs are too dark. It is possible to adjust the inking so that A and B2 are optimised, but not both A and B1. The example on the right illustrates the condition where an area of heavy ink consumption is in track with images that consume much less ink. The high ink demand of the solid leads to excessive ink building up in the ink roller system and consequential over-inking of the lower consumption halftone images.